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PROGRAMME PLANNING

Country and intercountry programmes and projects

ASSISTANCE FOR A GLOBAL PROJECT

Ecologically sustainable cassava plant protection in South America and Africa: an environmentally sound approach (GLO/91/013)

International Institute for Tropical Agriculture (IITA) and Centro Internacional de Agricultura Tropical (CIAT)

Recommendation of the Administrator

Estimated UNDP contribution	$10 084 000
Duration	Four years
Executing agency	OPS

I. BACKGROUND

1. Brazil is the world's largest cassava producer with 58 per cent of its production (approximately 14.5 million tons) found in the north-east region. Most cassava in this region is grown by tenant farmers who cultivate plots of less than one hectare on infertile soil and with limited rainfall. Cassava productivity in the north-east is a third less than in the rest of Brazil. Africa accounts for 40 per cent of the world's total cassava production; and one third (17 million tons) of African production is in West Africa. Cassava is a food staple and the most important source of carbohydrates for at least

75 million Africans. Cassava is grown by small-scale farmers, mostly women on plots of less than half a hectare. Production rarely exceeds 8 tons per hectare. In general, cassava is able to grow under conditions that are unsuited for other crops, and is frequently the crop that sustains populations during droughts. It is an important food staple for both the rural and the urban poor.

2. Cassava demand in Africa and north-east Brazil is increasing and is resulting in intensification of production. However, pests represent a significant production constraint in both areas. The intensification of cassava production is making commercial pesticide usage increasingly attractive, and this can only be restrained if an economical and feasible alternative for pest control is developed and applied as soon as possible. Thus, the need for appropriate crop protection technology that is not based on synthetic pesticides is especially critical. Cassava pests, including arthropods, pathogens and weeds, can reduce cassava production by as much as 50 per cent and it is critical to develop and apply environmentally sound pest management systems before synthetic pesticide usage becomes entrenched.

3. Appropriate combinations of biological control, resistant germplasm and cultural practices are the basis of ecologically sound plant protection. Traditional systems of cassava-based cultivation are an ideal starting point for the development of cassava protection practices. Extreme remedial control measures, such as the use of pesticides, are only necessary if and when the ecological approach fails to provide an adequate solution. This strategy conserves the efficacy of natural enemies and preserves the environmental integrity of the food-chain within the agro-ecosystem.

4. Women have a primary responsibility for cassava production in Africa. However, women only occupy 7 per cent of government extension-service positions, and hold fewer than 4 per cent of the professional agricultural positions, even though they produce as much as 70 per cent of the domestically consumed food.

5. IITA and CIAT have worked together over the last decade to develop sustainable cassava protection technologies for Africa and South America. This Latin America-Africa cooperation provides access to natural enemies, resistant germplasm, and production expertise that is essential for national programmes aimed at developing and implementing appropriate cassava protection technologies. The catalyst that initiated IITA and CIAT collaboration was the introduction to Africa of the cassava mealy bug from South America. This pest spread rapidly throughout the continent and produced widespread devastation. With support from the UNDP intercountry programme for Africa, the International Fund for Agricultural Development (IFAD) and other donors, IITA thus initiated a classical biological control campaign in the early 1980s, and CIAT assisted by locating the natural enemies of the mealy bug in South America. IITA then reproduced the natural enemies and implemented the release and follow-up campaign in Africa. Today, the cassava mealy bug is substantially controlled in Africa as a direct consequence of this effort. This international collaboration resulted in one of the most successful

biological control campaigns ever undertaken. A recent economic analysis shows that the benefit:cost ratio of this control campaign was conservatively estimated at 149:1.

6. In summary, cassava cultivation in parts of Africa and north-east Brazil is practised under a set of ecological agronomic and socio-economic conditions and constraints that have much in common. Demand for cassava in both regions is increasing, and is resulting in intensification of production. Through bilateral collaboration and networking with other international and national institutions, CIAT and IITA have developed the knowledge base, technology components, training expertise and farmer participatory methodology necessary to develop an integrated approach to cassava pest control, decreasing the need for and the use of commercial pesticides.

II. THE PROJECT

7. This project will be carried out in Africa by IITA in collaboration with national programmes in Benin, Cameroon, Ghana and Nigeria, and in South America by CIAT in collaboration with Empresa Brasileira de Pesquisa Agropecuaria in north-east Brazil. The four interested countries in Africa have ecologically similar production areas, are accessible by road and air, and possess the necessary institutional capacity and commitment to contribute to and benefit from the project. The activities to be carried out in these sub-regions may become a model for other cassava growing countries and regions in Africa and South America.

8. The project will develop, test and implement sustainable cassava protection technology for the most damaging cassava insect pests found in north-east Brazil and in the African countries. It will feature collaboration with national plant protection staff, extension workers and farmers from Brazil, Ghana, Benin, Nigeria and Cameroon. In order to increase the probability of technology adoption, extension workers and farmers will be trained in the principles and practices of sustainable cassava protection. In a special effort to enhance the capacity of African women in national systems, IITA will provide African women from each participating country with M.Sc. (or equivalent) training fellowships. These women candidates may also participate in the African Women Leaders in Agriculture and the Environment programme of the Winrock International Institute for Agricultural Development, which is an effort to enhance women's skills in policy, management, research and extension.

9. The specific objectives of the project are to:

(a) Assemble multi-disciplinary national programme teams in each participating country and develop detailed workplans for diagnostic surveys in order to identify and map the major pest constraints, farmers' perceptions and current practices;

(b) Ascertain the level and type of research required to overcome the major pest constraints identified through the diagnostic surveys and identify sites for farmer evaluation of available cassava protection technologies;

(c) Develop training materials for national programme staff, extension workers, farmers, and train researchers, extension workers and farmers in the principles and practices of ecologically sustainable crop protection;

(d) Test, adapt and evaluate pest control technologies in collaboration with farmers, extension workers, and national programme staff; and estimate potential impact of tested pest control technologies over a range of ecological, agronomic and socio-economic conditions;

(e) Evaluate the effectiveness and impact of the training programme and the effect of the adoption and impact of the technology components adapted by farmers.

10. In support of the above plan, methods will be developed for decentralized mass rearing and field release of biological control agents. Other research will be concerned with strain selection of cassava green mite, fungal pathogens, root rot etiology, impact of biological control agents on non-target organisms, screening technology components for undesirable environmental effects, and development of strategic and tactical models. Support activities for the project include mass production of natural enemies for use in farm trials and by national programmes, multiplication of planting material, shipments of natural enemies from South America to Africa via quarantine in the Netherlands, and shipments of natural enemies from CIAT to Brazil via quarantine at the Centro Nacional de Pesquisa para Defesa da Agricultura, Jaguariuna, São Paolo, Brazil. In addition, limited expert technical assistance will be offered by Texas A & M University (United States), and the University of California (Berkeley) (United States), in systems modeling. Finally, the Food and Agriculture Organization of the United Nations (FAO) will assist in aspects of the country training activities.

11. The potential benefits of this project to the people of Brazil, Ghana, Nigeria, Benin and Cameroon include the following:

(a) Enhanced capability of national programmes for research on plant protection problems with sustainability as a major objective; and development of information resources to facilitate the implementation of similar initiatives in the future;

(b) Improved cassava productivity for small-scale cassava farmers;

(c) Enhanced environmental quality and human health.

12. There are several features of the proposal that recommend it for the support of the Division for Global Interregional Programmes. First, it is concerned with production and sustainability of a major staple food for

low-income populations in Africa and Latin America. Second, the collaboration between two institutes of the Consultative Group on International Agricultural Research, scientists, extension agents and farmers in five developing countries will promote rapid development of the technology and extension to farmers. Third, the proposal emphasizes the dominant role of women in African cassava production. Finally, the intensification of cassava production is making commercial pesticide usage increasingly attractive, and this can only be restrained if an economical and feasible alternative for pest control is developed and applied as soon as possible. The project, therefore, contributes to the following UNDP themes identified by the thirty-seventh session of the Governing Council: environment and natural resource management; TCDC; technology for development; poverty eradication, and women in development.

13. The project will be subject to periodic external reviews and will receive a thorough evaluation at termination. Furthermore, opportunities will be sought to collaborate with other donors, countries and institutions that may wish to associate themselves with this research.

14. The total cost of the four-year project is $10,084,000, 62 per cent of which will be spent in Africa and 38 per cent in Latin America. The African budget allocates approximately 40 per cent to R & D at IITA, 29 per cent to IITA training and coordination, and 31 per cent to research, training and extension in the four collaborating countries. The Latin American budget allocates roughly 46 per cent to CIAT research, training and coordination, and 54 per cent to research, training and extension in Brazil. Estimated counterpart contributions include the following: CIAT ($1,872,000); IITA ($1,700,000); Benin, Cameroon, Nigeria, Ghana ($20,000 each); and Brazil ($1,418,000).

III. RECOMMENDATION OF THE ADMINISTRATOR

15. The Administrator recommends that the Governing Council approve this project.